

## CLAIMS

1. A sound diffuser with low frequency sound absorption, comprising:

a) a body having a front surface configured to diffuse sound waves; and

b) means incorporated into said front surface for absorbing sound waves below a desired cut-off frequency.

2. The invention of Claim 1, wherein said front surface includes a plurality of divided or non-divided parallel wells.

3. The invention of Claim 1, wherein said front surface includes a two-dimensional pattern of geometrical or irregular shape chosen from the group consisting of cylindrical, conical, pyramidal, polygonal <sup>and</sup> or rectangular.

4. The invention of Claim 3, wherein said shapes are separated by slots or holes.

5. The invention of Claim 4, wherein said incorporated means is formed in said slots or holes.

6. The invention of Claim 1, wherein said front surface comprises a compound curved shape.





b) calculating a number of perforations to be formed in an existing diffuser and their respective areas by using existing standard acoustic formulations such as:

where  $f$  is the peak absorptive frequency,  $c$  is the speed of sound in air,  $S$  is the cross-sectional area of a hole,  $L$  is the apparent depth of a perforated sheet, and  $V$  is an enclosed volume in a cavity;

c) forming perforations of desired dimensions through a front surface of said diffuser to create said device;

d) designing a diffusive surface shape of said diffuser to create diffusion above the crossover frequency using techniques including but not limited to number theory and acoustical optimization;

e) installing said device.

21. The method of Claim 20, wherein said front surface includes a plurality of divided or non-divided parallel wells.

22. The method of Claim 20, wherein said front surface includes a two-dimensional pattern of geometrical or irregular shapes chosen from the group consisting of cylindrical, conical, pyramidal, polygonal or rectangular.

23. The method of Claim 22, wherein said shapes are separated by slots or holes.

24. The method of Claim 20, wherein said front surface comprises a compound curved shape.

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